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Emotions and Self-Esteem as Indicators of Somatic Complaints in Children

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The literature on somatic complaints in children without a clear physical medical cause often demonstrates connections with various psychological factors, such as negative emotions and problems handling them, poor self-image, and coping potential. We entered these elements into a structural model to elucidate the relationships among them and tested it on 330 children (mean age 10 years and 9 months). The results showed that mood balance contributed most to the prediction of self-reported somatic complaints. Moreover, mood (in combination with anxiety and depression problems) had an indirect impact on children's somatic complaints by influencing self-esteem. The influence and position of coping was less clear. The results are discussed in terms of the 'symptom perception theory'. Copyright © 2006 John Wiley & Sons, Ltd.

Key words: somatic complaints; emotions; self-esteem; coping; depression; social anxiety

INTRODUCTION

In the last few decades, there has been what one might call a 'break-through' in the evidence showing support for relationships between psychological factors and the report of somatic complaints. Although the interaction between body and mind was acknowledged before (e.g. Van der Feltz-Cornelis & Van Dyck, 1997 for a historical overview), nowadays we have a scientific basis to assume that psychological problems not only result from somatic complaints, but can also be of major influence in the explication of medically unexplained somatic complaints and even in the etiology of symptoms that have a clear organic basis

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(Mayer, 1996; Gatchel, 2004). An example of the second account is the finding that people who have been exposed to a cold virus are more likely to show symptoms of a cold when they have been under a large amount of stress (Cohen, Tyrrell, & Smith, 1993). This may seem promising for taking preventive measures at an early age, yet relatively few empirical studies have been conducted with the purpose of linking somatic complaints to psychological factors in children, despite the fact that somatic complaints, such as recurrent stomach-aches, are common in young people (Kokkonen, Haapalahti, Tikkanen, Karttunen, & Savilahti, 2004; Perquin *et al.*, 2000) and that these complaints often continue into adulthood (Brattberg, 2004; Fearon & Hotopf, 2001). In the present study, conducted with children aged 8–13, we focused on several psychological factors that are often associated with reports of somatic complaints in adults and children, these being negative mood valence, symptoms of affect disorders (depression and social anxiety), coping and self-esteem. In contrast to most studies in which these variables are considered separately (Campo, Come, Jansen-McWilliams, Gardner, & Kelleher, 2002; Campo *et al.*, 2004; Gordon, Dooley, & Wood, 2004; Scharff, Turk, & Marcus, 1995) we studied the relationships between these variables from a theory-driven perspective.

One of the most elaborate psychological theories that aims to explain the report of somatic complaints in the presence of psychological problems or challenges is the 'symptom perception' hypothesis (Pennebaker, 1982). Emotions, especially negative emotions, always coincide with more or less noticeable physical signals (e.g. increased heart rate, perspiration, discomfort in the stomach and the like) that could also indicate physical dysfunction (Watson & Pennebaker, 1989). Analysing the context in which the symptoms occur usually prevents one from attributing physical changes to the wrong cause (Schachter & Singer, 1962). For example, before an important job interview, most people will interpret their perspiration as an emotional experience and not the flu. However, individual differences can moderate the way people tend to interpret physical signals. People who report many somatic complaints might be biased in the sense that they are inclined to interpret physical signals that stem from emotional arousal, as somatic dysfunctions. The symptom perception hypothesis assumes a limited information-processing capacity in which internal and external cues rival for attention. A focus on somatic sensations and explanations inhibits attention to the emotional, external situation. This process can be demonstrated empirically (Pennebaker, 1982; Pennebaker & Lightner, 1980; Pennebaker & Skelton, 1981).

This process of misattribution can also explain the frequently found strong relationship between negative affect and somatic complaints in adults and children (Campo *et al.*, 2004; De Waal, Arnold, Eekhof, & Van Hemert, 2004; Kronenberger, Laite, & Laclave, 1995; Taylor & Garralda, 2003; Whitehead, Palsson, & Jones, 2002). Negative emotions are usually accompanied by more frequent and more salient physiological reactions than positive emotions. Therefore, misattributions could more easily occur when people have frequent negative emotions. This raises the question of how people are able to report their negative feelings, when it is assumed that they appraise their bodily signals incorrectly as a physiological problem. An explanation is that people may not be sufficiently aware of their emotions the moment that they arise. Consequently, the negative emotion is not dealt with and lives on as a mood residue (Frijda, 1986). The tendency of mood residues to add up and surface into consciousness at a given moment means that their origin is already almost impossible to retrace. Additionally, the stress of the unsolved situations could, with time, create permanent somatic dysfunctions by overtaxing the body (Padgett & Glaser, 2003;

Tsigos & Chrousos, 2002; Van Oudenhove, Demyttenaere, & Tack, 2004). In other words, somatic attributions can become self-fulfilling when they prevent people from analysing the situation in emotional terms. So, whereas the symptom perception hypothesis claims that the misattribution of physiological signals that accompany negative emotions [*pur sang*] might be sufficient to explain somatic complaints, it could be argued that a failure to adequately cope with emotional situations explains why the emotion lives on as a mood residue but also the occurrence of stress related physical problems.

Everybody suffers from negative emotions from time to time. Also, depending on the circumstances, can everybody misinterpret the accompanying physiological signals (Pennebaker, 1982). The symptom perception hypothesis is not restricted to particular groups; therefore it can be assumed that there is a direct pathway from negative moods to somatic complaints. However, some people are likely to be more vulnerable to misattributions than others. As compared to an acute emotion, mood already has a lasting effect. But, when a negative emotion becomes a real trait factor, as in the case of anxiety disorders or depression, the relatively high frequency of negative emotions not only enhances the likelihood of systematic misattributions but, as a consequence, also on comparatively strong mood residues. With respect to the relationships between affect and somatic complaints we will consider another pathway that is mediated by self-esteem.

Studies that focus on the direct relationship between somatic complaints and self-esteem usually report a rather small but consistent relationship (e.g. Kronenberger *et al.*, 1995). It has been demonstrated that people with low self-esteem have more negative thoughts and memories when in a negative mood, whereas people with high self-esteem engage more in positive emotional thinking in order to alleviate their negative mood (Heimpel, Wood, Marshall, & Brown, 2002). This indicates that low self-esteem not only strengthens negative feelings, but also undermines the ability to adequately cope with these feelings (Rector & Roger, 1996), which in turn contributes to stress continuation. This latter effect can be illustrated by the finding of Pruessner, Hellhammer, and Kirschbaum (1999) that low self-esteem is related to an enhanced physiological (adrenocorticol) response to experimentally induced failure. Positive feelings, on the other hand, induce an optimistic vision which tends to enhance self-esteem and successful coping (Peterson, Seligman, & Valliant, 1988). This could explain the negative relationship between positive feelings and somatic complaints (Rieffe, Meerum Terwogt, & Bosch, 2004).

In addition to the assumption that affect as an explanatory factor for somatic complaints will often be mediated by self-esteem, another candidate is the coping focus. People, who define their problems as physiological instead of emotional, will adapt their coping focus accordingly and aim for a medical solution. However, when the critical problem is that they insufficiently analyse the situation, the choice of coping might also depend on other factors besides attribution. Coping focus might then be especially coloured by (symptoms of) affect disorders. Anxious people, for instance, are likely to stay focused on the negative consequences of every coping option they can think of and therefore probably abstain from almost all adaptive coping actions in everyday life (Vasey, Daleiden, Williams, & Brown, 1995). A tendency for depression, on the other hand, may very well elicit an enhanced physiological coping focus. Depressed people are known to focus more on their internal signals than on the outside world (Sloan, 2005). Consequently, they will be more likely to explicitly notice their bodily signals more often than others. Furthermore, if they fail to connect these signals to their (external) emotional source, they can be expected to look

primarily for a remedy of the bodily signals *pur sang*. Alternatively, if we take somatic complaint reports as a sign that people are focused on their bodily processes, an enhanced physiological coping focus could also be regarded as a consequence of that attention process.

In line with the arguments stated, in this study we aimed to test a model in which the negative emotion variables (conceptualized from both a mood and trait affect perspective) are regarded as interrelated causal factors for somatic complaints, in which especially the trait aspects (depression and anxiety) will be mediated by self-esteem. Furthermore, we explored the position of a physiological coping focus as a possible mediator between depressive tendencies and somatic complaints.

The three basic negative emotional states (sadness, fear and anger) were all positively related to somatic complaints in previous studies, whereas the relationship with happiness was negative (Rieffe *et al.*, 2004). Therefore, we used *mood balance* as a combined variable for general negative mood, consisting of a combination of anger, fear, sadness and happiness (which was subtracted). Trait indices were added for *depression* and *social anxiety*. Although general anxiety indices, like Spielberger's STAIC (1973), are known to be related to somatic complaints (e.g. Garber, Walker, & Zeman, 1991), the shared variance with depression is high (Clark & Watson, 1992). Therefore, the unique contribution of a general anxiety index to the model will be limited. The shared variance with social anxiety, although probably still considerable, is likely to be somewhat smaller. However, we had a more important reason to opt for this index instead of general anxiety: social anxiety is known to increase in middle and late childhood, whereas general fears tend to decrease (Westenberg, Drewes, Goedhart, Siebelink, & Treffers, 2004). Around the age of ten—the age group under study in the present experiment—is social anxiety therefore expected to be the more prominent of the two.

METHOD

Participants

In this study 352 children (189 girls, 163 boys) were selected from primary schools and secondary schools in The Netherlands. The participants came from middle class regions in the Dutch cities Enkhuizen, Bussum and Breda. Parental consent was obtained for all participants prior to conducting the study. A total of 330 children completed the full set of 6 questionnaires, thus data from 22 participants was omitted from analyses. The age range of the 330 participants was 8 years and 4 months to 13 years and 4 months (average age was 10 years and 9 months, standard deviation was 1 year and 2 months for the selected group ($n = 352$) and the final group ($n = 330$)).

Materials and Procedure for Administering the Questionnaire

Six questionnaires were completed in school classrooms, divided into two sessions. The total process took about an hour and a half. Table 1 lists the relevant data (number of items, minimum and maximum score, average and standard deviation) and the results of the internal consistency analysis for each questionnaire.

The *Somatiek Lijst* [Short Somatization Index] was used to obtain children's self report of their health. This index was constructed for a previous study (Rieffe

Table 1. Internal consistency standards by scale ($n = 330$)

Scale	Number of items	Min score	Max score	M	S.D.	Cronbach's alpha
Somatization index	8	8	22	13.16	2.34	0.72
CDI (depression)	28	0	33	5.93	5.46	0.84
SAS-K (social anxiety)	46	0	37	7.06	7.41	0.86
CBSK (self-esteem)	36	67	144	112.74	14.95	0.81
MB (mood balance)	16	1	28	10.19	3.86	n.a.
Coping focus	22	-14	9	-2.30	4.58	n.a.

Note: MB and Coping Focus are combined scale scores. The Cronbach's Alphas of the separate scales range from 0.73 to 0.85.

et al., 2004) using teacher's spontaneous responses to the question 'what health problems do children complain of?' It reflects the most common symptoms reported and contains items included in more extensive somatization measures, e.g. the Children's Somatization Index (CSI; Walker & Greene, 1989). Since its development the index has been employed in a number of studies (e.g. Rieffe, Jellesma, Meerum Terwogt, Bosch, Kneepkens, & Douwes, submitted; Rieffe, Oosterveld, & Meerum Terwogt, 2006). The Short Somatization Index asks children how they felt lately. Children were presented with 8 health-related statements and asked to tick the box they considered most applicable on a 3-point scale. The total score consisted of the sum of these 8 items, with two positively stated items being recoded. The internal consistency of this scale is good and satisfies the minimum of 0.70, which corresponds with previous findings from this list in children from a normal population, but also in children who attended an outpatient clinic for abdominal pain (Rieffe, Meerum Terwogt, & Bosch, 2002; Rieffe *et al.*, 2004, 2006, submitted). A sample item is: 'I (never/sometimes/often) have a stomach ache'.

The *Stemmingslijst voor kinderen* [children's mood list] (Rieffe *et al.*, 2002, 2006) comprises 16 items, in which the four basic emotions happy, scared, angry and sad are represented by 4 equivalents of the corresponding emotion (aside from 'happy', these might be 'cheerful', 'nice' and 'pleasant'). The internal consistencies of the subscales are good (Rieffe *et al.*, 2002, 2004, 2006). However, for the purpose of this study we only used an overall score for negative affect, which we defined as: Anger + Fear + Sadness - Happiness. We found a good internal consistency for all subscales of this Mood Balance (MB, see Table 1). A sample item is: 'I (never/sometimes/often) feel happy'.

The Dutch version of the *Children's Depression Inventory* (CDI; Kovacs, 1992; Dutch translation: Timbremont and Braet, 2002) comprises 27 items and is designed for children aged 8 to 15. Each item consists of 3 statements. Children are expected to mark the statement they feel best describes them. The internal consistency of this list is good (see Table 1).

The *Sociale Angst Schaal voor Kinderen* [Social anxiety scale for children] (SAS-K; Dekking, 1983) is the list used most in the Netherlands for assessing social anxiety. The SAS-K comprises 46 items and meets the internal consistency and validity requirements for the 9 to 12 age range.

The *Competentiebelevingsschaal voor Kinderen* [Competence perception scale for children] (CBSK; Veerman, 1989) is a Dutch version of Harter's *Self-Perception Profile for Children* (1982). It comprises 36 items divided into 6 sub-scales. The scale has not yet established a strong reputation for internal consistency and validity (especially for those interested in the sub-scales). At this time, however, it

is the only instrument available for determining the sense of self-esteem among children aged 8–12. As a result of these limitations only the total score of the scales were used in this study. The internal consistency for the total score was good (see Table 1).

The *Copingfocus vragenlijst* [Coping Focus questionnaire] has been devised for this study and consists of brief descriptions of stressful situations referring explicitly to both an emotional experience and an appropriate physiological response. A possible reaction is then described, and children are asked to indicate on a 3-point scale to what extent they would react this way. In some cases the response served to deal with the physiological symptom, in others it was intended to reduce the emotion. Two scales were constructed based on the summed scores: the physiological coping scale (12 items) and the emotional coping scale (10 items). The total score was based on the score on the physiological scale minus the score on the emotional scale. The internal consistency of both scales is good (see Table 1).

A sample item that addresses the physiological complaint is: 'Today is your first tennis lesson. You don't know anybody there. You're scared, and your stomach begins to ache.' Response: 'I would (not/perhaps/definitely) take a pill for my upset stomach.'

An example highlighting the emotional response is: 'You are supposed to give a presentation at school today. Before you begin, you feel nervous and sick.' Response: 'I would (not/perhaps/definitely) practice during the break so that I would feel less nervous.'

Note that the emotion focused solution is based on detection of the external emotion eliciting source: the nerve-racking presentation.

RESULTS

Correlations Between the Variables

Our first step was to check the hypothesized relations with Pearson product-moment correlations. The results are presented in Table 2. All variables, apart from an emotional coping focus, proved to be related to somatic complaints. In fact, besides its correlation with the other coping focus, an emotional coping focus seems to have a relationship with none of the other variables. Somatic complaints are only related with a strong tendency to focus on physical aspects; a

Table 2. Correlation matrix ($n = 330$)

	Somatic complaints	CDI	SASK	CBSK	MB	Coping focus	Emotional (Coping focus)
Depression (CDI)	0.37***						
Social anxiety (SASK)	0.32***	0.50***					
Self-esteem (CBSK)	-0.38***	-0.59***	-0.46***				
Mood balance (MB)	0.57***	0.41***	0.34***	-0.35***			
Coping focus	0.18***	0.27***	0.12*	-0.16**	0.12*		
Emotional	0.05	-0.05	0.09	0.08	0.11*	-0.31***	
Physiological	0.21***	0.20***	0.18***	-0.08	0.19***	0.68***	0.49***

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

focus that is also related to all negative emotion variables (which obviously are also strongly interrelated). As hypothesized the trait variables depression and anxiety are related to negative self-esteem. A similar, but not as strong relationship, can be found between self-esteem and a negative mood balance (MB) during the last period.

Path Model

Path analysis was conducted to test a number of hypotheses: (a) that the positive relationship between negative affect and somatic complaints is (partially) mediated by self-esteem, (b) that coping focus is related to more somatic complaints, and (c) that depression, in contrast to anxiety, also influences somatic complaints by an independent pathway; namely, by eliciting a coping focus on somatic symptoms. For this analysis Structural Equation Modeling Software (EQS, version 6.1) was used. The path model contains three emotional components as independent variables: negative mood balance, social anxiety and depression. The model also includes the mediating variables: self-image and coping focus. The results are depicted in Figure 1: Arrows indicate the directions of the paths, path coefficients (β) at each arrow indicate the nature and strength of the link.

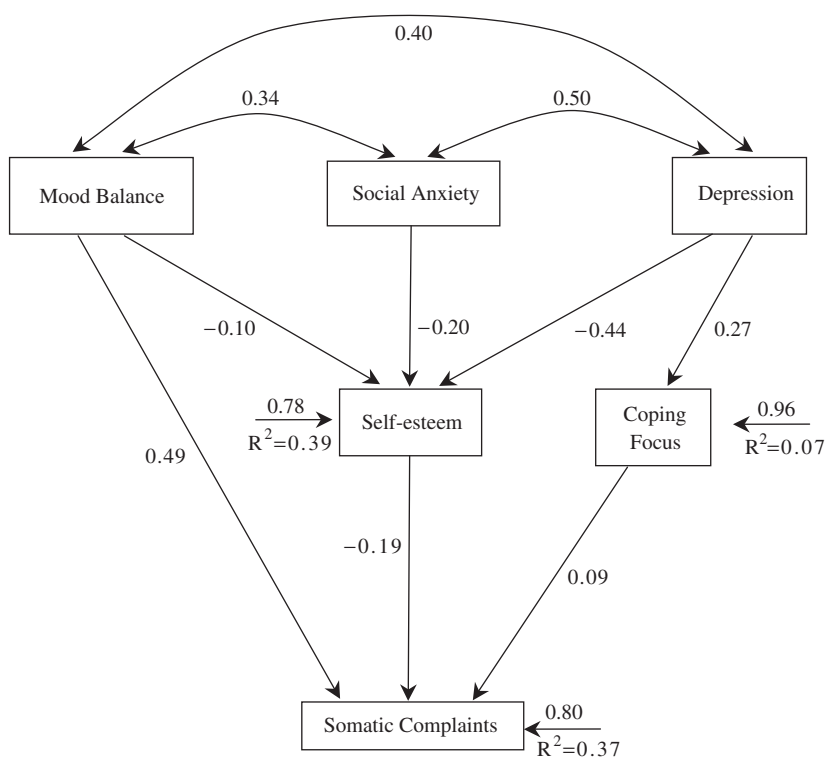


Figure 1. Path analysis illustrating direct and indirect relationships between mood balance, symptoms of social anxiety disorder and depression with somatic complaints, partially mediated by self-esteem and coping focus.

Mood Balance, Self-Esteem and Somatic Complaints

The paths between the three independent variables are fairly strong, as could be expected in advance and as revealed by the correlation matrix. The three variables are included separately in the model to examine the unique contribution to the prediction of reported physical complaints for each variable. However, because the three variables have some overlap in construct (that is negative affect), they were allowed to correlate in the model. No other reciprocal links are assumed.

Figure 1 reveals a direct influence of mood balance on somatic complaints, as could be expected. Because the paths reflecting direct relationships of both social anxiety and depression with somatic complaints were not significant, we used a chi-square difference test to analyse whether these paths should be removed from the model. Indeed, deletion of the direct paths did not influence the model fit, $\Delta\chi^2$ ($df = 2$) = 2.56, $p = 0.27$. We therefore only included the indirect (mediated) paths in the final model.

All three independent variables did have a negative influence on self-esteem (of which they explain 39% of the variance as a whole). The role of depression in predicting a negative self-esteem appears particularly pronounced. Still, the direct influence of the mood balance on somatic complaints is noticeably stronger than the combined influence the three independent variables exert via self-esteem.

Depression, Coping Focus and Somatic Complaints

The second hypothesized pathway of psychological factors contributing to somatic complaints was that of coping focus, presumably also serving as a partial mediator in the relationship between symptoms of depression and somatic complaints. The results shown in Figure 1 reveal that depression only explains a small part of the variance in coping focus (7%). The pathways with social anxiety and MB through coping focus proved to be non-significant and were removed from the model. Coping focus in its turn plays a minor but significant role in explaining somatic complaints: A focus of coping that is directed more at physiological than emotional factors, is associated with more somatic complaints.

We also compared the depicted model with a model in which the coping focus was defined as a *consequence* rather than a cause of somatic complaints. This intervention left the fit of the model virtually the same, giving no clear insights into the direction of the relationship.

Fit of the Complete Model

The complete model explained 37% of the total variance in self-reported somatic complaints and is therefore relevant with regard to self-reported somatic complaints but does not fully explain them. The complete model yields a χ^2 of 2.68 ($DF = 5$) and a p value of 0.75. Since the presumed model and the empirical data do not differ significantly, the model can be accepted as a good presentation of the data. Moreover, after rounding to two decimals, the CFI degree of fit (Jöreskog & Sörbom, 1989) reaches the ideal value of 1.00 and the RMSEA ('test for close fit', Steiger, 1990) the similar ideal value of 0.00 (standard requirement < 0.05). The finding that these three measures of fit are met indicates that the model fits excellently with the empirical data.

DISCUSSION

In the current study we analyzed the relationship between mood balance, social anxiety, depression, self-esteem, coping focus and self-reported somatic complaints in children. The model we presented could explain 37% of self-reported somatic complaints. We found a direct relationship between mood balance—which refers to more negative moods and fewer happy moods—and somatic complaints. Symptoms of affect disorders (depression and social anxiety) were also related to more self-reported somatic complaints. However, the results indicate that there is only an indirect additive effect of affective traits over that of negative mood, through the mediation of self-esteem. In addition to the direct pathway, mood balance appears to have also a relatively small but significant indirect effect on somatic complaints through self esteem. This can be explained in two ways. First, the lasting effects of moods indicates that, they can be considered as falling in between a temporary emotions and more permanent trait characteristics. As such they are also likely to influence self esteem to some extent. Second, a negative mood balance might impinge on trait factors other than the two included, like anger, anxiety outside the social domain or maybe even proneness for shame. As discussed in the introduction, low self-esteem can prohibit emotion regulation, causing more aversive physiological reactions when a child is confronted with negative experiences. The pathway found between self-esteem and somatic complaints is consistent with this process. An alternative or additional interpretation of this pathway is that children with a low self-esteem prefer to define themselves in terms of illness rather than acknowledge their typical tendency to react emotionally; a tendency that is strongly associated with feelings of incompetence for these children. Therefore, the illness interpretation could be a way to protect their self-esteem from further damage. The consequences of illness (e.g. staying away from school or withdrawal from activity participation) might even be considered as secondary gain for socially anxious and depressive children (Radley & Green, 1987; Walker, Claar, & Garber, 2002) and fits in with the most characteristic coping tendency of both groups: avoidance (Daleiden & Vasey, 1997; Garber, Braafladt, & Zeman, 1991).

Besides the relationship between negative mood balance, self-esteem and self-reported somatic complaints, we also analyzed the pathway from depression through coping focus to somatic complaints. Compared with other people, depressed people are known to focus more on internal signals than on external circumstances (Sloan, 2005). Therefore we expected the children in our study to pay more attention to their bodily signals than to the emotional impact of the situation, and to display a coping focus in line with this attention bias. This idea was sustained by a significant but weak positive relation between depression and the physiological end of the coping balance. Moreover, the second step in this pathway provided additional confirmation: the coping balance explained a modest additional part of the variance in somatic complaints. Two reservations have to be made concerning this conclusion. First, the relation between coping balance and somatic complaints could also be reversed: a model in which the coping balance is regarded as a consequence of the awareness of somatic problems could also explain the data. A longitudinal study could shed more light on this issue. Second, additional analysis of the coping balance revealed that depression and somatic complaints are related to the physiological but not the emotional scale. This outcome seems to undermine Pennebaker's rivalry hypothesis (Pennebaker & Lightner, 1980; Pennebaker & Skelton, 1981). However, the Coping Focus Questionnaire may be limited in revealing this kind of rivalry

because an emotional point of view, which might have escaped somebody's attention in normal circumstances, could be hard to ignore when explicitly asked about. Given that the Coping Focus Questionnaire is a newly developed instrument, more research is necessary in order to gain a better understanding of the relationship between depression, coping focus and somatic complaints.

Taken together, the current findings indicate that especially negative mood balance is directly related to more self-reported somatic complaints, whereas self-esteem is a mediator in the relationship between depression, social anxiety and somatic complaints. This finding does not only stress the importance of self-esteem in the explanation of somatic complaints, but also the importance of studying more than one variable at the same time when trying to understand somatic complaints. A pitfall of this study was that the data were collected at a single point in time; longitudinal research is necessary to confirm the suspected causality of the relationships we found. In future studies, a larger variety of interactions between variables of psychological and medical nature have to be considered in order to account for the 63% of the variance in somatic complaints that remained unexplained in the current study. Such broader studies are needed for a better understanding of findings from research in which the candidate variables are analysed in a more segmented way.

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